ENGINEERING CHANGE NOTICE

1. ECN 634620

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. Date
Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	F. N. Hodges, PSS/HTS, H6-06, 376-4627	12/27/95
	5. Project Title/No./Work Order No.: Interim Status Groundwater Monitoring Plan for the Nonradioactive Dangerous Waste Landfill, Hanford, Washington	6. Bldg./Sys./Fac. No.: NRDWL
		7. Impact Level: QE
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.): WHC-SD-EN-AP-026, Rev. 0	9. Related ECN No(s).: N/A
		10. Related PO No.: N/A

11a. Modification Work	11b. Work Package No.	11c. Modification Work Complete	11d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 11b) [X] No (NA Blks. 11b, 11c, 11d)	N/A	N/A Cog. Engineer Signature & Date	N/A Cog. Engineer Signature & Date

12. Description of Change

See Attached.

13a. Justification (mark one)							
Criteria Change	[]	Design Improvement	[]	Environmental	[X]		
As-Found	[]	Facilitate Const.	[]	Const. Error/Omission	[]	Design Error/Omission	[]

13b. Justification Details

The changes bring the groundwater monitoring plan in line with changes in the sampling and analysis program and updates the groundwater monitoring network.

14. Distribution (include name, MSIN, and no. of copies)

See attached

RELEASE STAMP

AUG 07 1996

DATE:

STA: 37

HANFORD RELEASE

ID: 20

A-7900-013-2 (06/92) GEF095

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1) ~~172218~~ 634620

15. Design Verification Required	16. Cost Impact				17. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes N/A	Additional	[] $ N/A	Additional	[] $	Improvement	[] N/A
[] No	Savings	[] $	Savings	[] $	Delay	[]

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]		[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
N/A		

20. Approvals

Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog Engineer F. N. Hodges F.N. Hodges	12/28/95	PE	
Cog. Mgr. J. S. Schmid J.S. Schmid	12/29/95	QA	
QA W. R. Thachaberry W.R. Thachaberry	3-7-96	Safety	
Safety		Design	
Environ. ~~D. W. Fritz~~ W.E. Tobbe for WET	3-8-96	Environ.	
Other B. A. Williams	1/3/96	Other	
		DEPARTMENT OF ENERGY	
		Signature or Letter No.	
		ADDITIONAL	

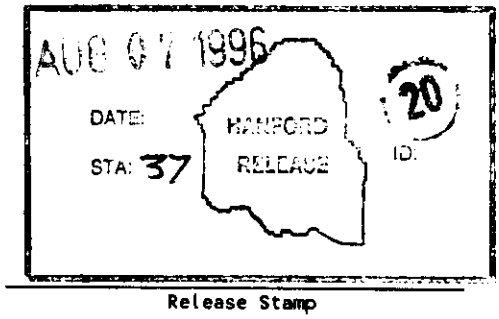
Interim Status Groundwater Monitoring Plan for the Nonradioactive Dangerous Waste Landfill, Hanford, Washington

Floyd N. Hodges
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: 634620 UC: 630
Org Code: 8H200 Charge Code: R4069
B&R Code: EW3120100 Total Pages: 118

Key Words: Groundwater, Monitoring, RCRA, NRDWL

Abstract: This replacement brings the groundwater monitoring plan into line with changes in the sampling and analysis program and updates the groundwater monitoring network to reflect new wells.



Release Approval Date

Release Stamp

Approved for Public Release

RECORD OF REVISION	(1) Document Number WHC-SD-EN-AP-026	Page 1

(2) Title

Interim Status Groundwater Monitoring Plan for the Nonradioactive Dangerous Waste Landfill, Hanford, Washington

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
	EDT-159220, 1/20/93	(5) Cog. Engr.	(6) Cog. Mgr. Date
0A RS	(7) Replace pages 29-31, 33-35, 40, 52, 55, A7-A8, and C-9 (Rev. 0) with corrected pages (Rev. 0-A).	Floyd N. Hodges 7/26/96	DG Horton 7/30/96
	ECN - 634620	FN Hedges	DG Horton

3.4 DETECTION LEVEL GROUNDWATER MONITORING SYSTEM

This section describes the aquifer that will be monitored, the location and justification of the monitoring wells, the installation of new wells, the hydrogeologic data to be collected, the frequency of sampling, and the groundwater constituents to be analyzed. Drilling, well construction, aquifer testing, and associated activities will be conducted according to the applicable Westinghouse Hanford procedures. Specific environmental investigation instructions (EII) are cited in sections of the plan. Additional EII may also apply.

3.4.1 Uppermost Aquifer

The unconfined aquifer beneath the NRDWL is contained primarily within sediments of the Hanford and Ringold formations and may extend from the water table to the top of basalt. The unconfined aquifer is discussed in more detail in Chapter 2.0. Hydrogeologic characterization activities are designed to obtain additional information on groundwater flow characteristics of the unconfined aquifer.

3.4.2 Background (Upgradient) Wells

Three wells (699-26-35A, 699-26-34, and 699-26-35C) were installed upgradient as background wells to determine the background groundwater chemistry (Weekes et al. 1987, Table 3-2). Wells 699-26-35A and 699-26-34 were completed in the top of the unconfined aquifer in the Hanford formation, and well 699-26-35C was completed in the upper Ringold Formation above the LPU. Well 699-26-35B, designed to monitor potentiometric levels above and below the LPU during and after pump tests still exists; however, it is not in use.

3.4.3 Detection (Downgradient) Wells

Four wells (699-25-34A, 699-26-33, 699-25-34B, and 699-25-33A) were installed as downgradient detection wells (Figure 10). Wells 699-25-34A, 699-25-34B, and 699-25-33 were completed in the top of the unconfined aquifer, in the Hanford formation, and well 699-25-33A was completed in the upper Ringold Formation above the LPU. A fifth well (699-25-33B), designed for monitoring potentiometric levels above and below the LPU during and after pump tests across the LPU and monitoring gradients across the LPU, still exists; however, it is not presently in use. All wells were designed for hydrogeologic characterization. Table 1 summarizes the construction details for the monitoring wells.

3.4.4 New and Proposed RCRA Monitoring Wells

~~Three additional monitoring wells,~~ Two new wells were completed in the top of the unconfined aquifer in 1992. ~~and~~ A deep groundwater monitoring and characterization is planned ~~for expanding the initial groundwater monitoring network~~. Estimated coordinates and construction details for this well~~s~~ are

Table 1. Construction Summary--The Nonradioactive Dangerous Waste Landfill Groundwater Monitoring Network.

Well number	Date completed	Depth drilled[a]	Casing/ Screen[b]	Screened depth[a]	Depth to water[a]	Date measured
699-26-34[c]	7/86	43.6 (143)	CS/SS 12.7-cm (5-in.)	35.7-41.8 (177-137)	37.63 (123.45)	7/86
699-26-35A[c]	7/86	46.6 (153)	CS/SS 12.7-cm (5-in.)	36.6-42.7 (120-140)	38.95 (127.79)	7/86
699-26-35C[c]	1/87	64.3 (211)	SS/SS 10.2-cm (4-in.)	58.8-61.9 (193-203)	38.9 (127.73)	1/87
699-26-33	9/86	44.8 (147)	CS/SS 12.7-cm (5-in.)	37.8-43.9 (124-144)	39.99 (131.20)	1/87
699-25-34A	7/86	44.2 (145)	CS/SS 12.7-cm (5-in.)	36.0-42.1 (118-138)	38.25 (125.49)	7/86
699-25-34B	9/86	43.0 (141)	CS/SS 12.7-cm (5-in.)	36.0-42.1 (118-138)	38.05 (124.84)	1/87
699-25-33A	1/87	77.7 (255)	SS/SS 10.2-cm (4-in.)	58.2-61.3 (191-201)	37.86 (124.20)	1/87
699-25-34D	10/92	52.7 (173)	SS/SS 10.2-cm (4-in.)	38.7-49.4 (127-162)	40.34 (132.35)	10/92
699-26-34B	10/92	50.3 (165)	SS/SS 10.2-cm (4-in.)	36.0-46.9 (118-154)	37.8 (123.95)	10/92

[a]Approximate depths in meters; feet in parentheses.
[b]SS--stainless steel; CS--carbon steel; casing diameter in parentheses.
[c]Upgradient well.

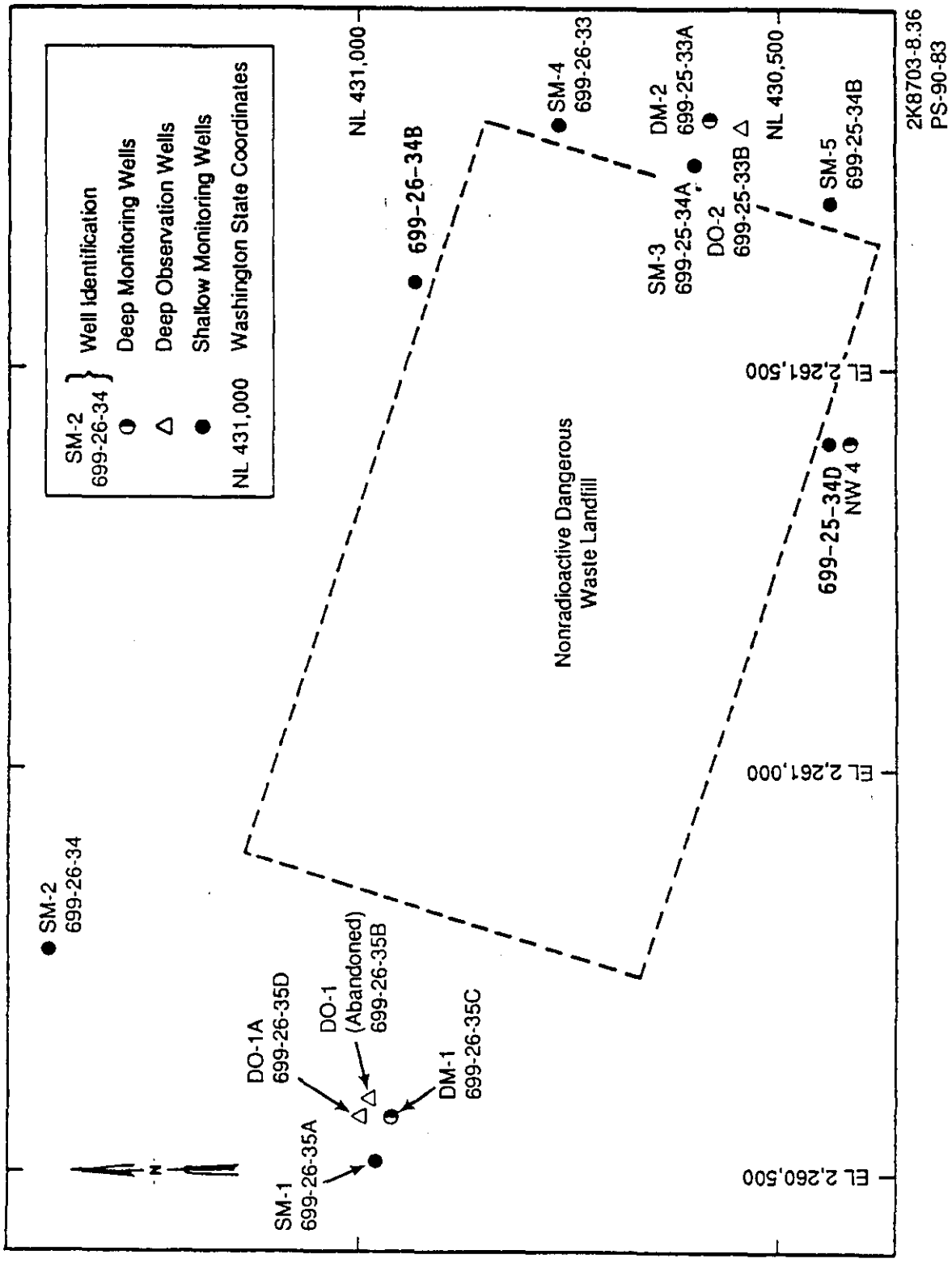
presented in Table 2 and shown in Figure 13. ~~The addition of these wells is not necessarily intended to represent the final groundwater monitoring network. Additional monitoring wells may be required to achieve full compliance with state and federal regulations. The placement of any additional new wells will depend on results of water level measurements, water quality analyses, hydrogeologic information, and tracer tests collected from this initial monitoring network.~~

Table 2. Construction Details--Proposed Nonradioactive Dangerous Waste Landfill Groundwater Monitoring Well~~s~~.

Well number	Estimated completion date	Estimated depth[a]	Casing/ Screen[b]	Screen length[a]	Estimated coordinates[c]
~~NW-1~~	~~FY 1992~~	~~45.7 (150)~~	~~SS/SS 10.2-cm (4-in.)~~	~~10.7 (35)~~	~~N 430,950 E 261,600~~
~~NW-2~~	~~FY 1992~~	~~45.7 (150)~~	~~SS/SS 10.2-cm (4-in.)~~	~~10.7 (35)~~	~~N 430,450 E 261,400~~
NW-~~3~~	TBD	175.3 (575)	SS/SS 10.2-cm (4-in.)	3.0 (10)	N 430,450 E 261,400

[a]In meters, feet in parentheses.
[b]SS--stainless steel; CS--carbon steel; casing diameter in parentheses.
[c]Lambert Coordinates.

Figure 13. Location Map Showing Proposed New Monitoring Wells.



3.4.5 Justification for Planned Well Locations

~~Two shallow groundwater monitoring wells and~~ A deep groundwater monitoring well will be installed around the NRDWL, ~~starting in fiscal year 1992~~ when funding is available. The justification for the location of the ~~three~~ new monitoring well~~s~~ is based on ~~uncertainties in groundwater flow directions and~~ the need for characterization of the deeper portions of the unconfined aquifer beneath the site.

~~The hydraulic gradient across the site is low, and there is much uncertainty about groundwater flow directions beneath the site (Section 2.3.3.1). The groundwater flow direction indicated by water level measurements differs by approximately 90° from groundwater flow directions indicated by contaminant plumes, and both differ from the assumed regional flow direction on which the initial detection level monitoring system is based. These uncertainties in groundwater flow direction indicate that the existing detection level monitoring system may not be complete. The groundwater flow direction calculated from water level measurements indicates that contaminants reaching groundwater from the NRDWL may pass north of the present downgradient wells undetected and that contaminants originating in the adjacent SWL may be detected by NRDWL downgradient wells.~~

Presently, no deep characterization or groundwater monitoring wells exist for the NRDWL. The two deepest wells at the NRDWL were drilled to depths of 70.1 m (230 ft) to 77.7 m (255 ft), penetrating approximately half of the thickness of the unconfined aquifer. The closest deep borehole, drilled as part of the Skagit/Hanford Project and not as a groundwater monitoring well, is approximately 0.8 km (0.5 mi) from the NRDWL. The planned deep well is necessary for the hydrogeologic characterization of the deep unconfined aquifer. A characterization that is important because of the documented disposal of chlorinated hydrocarbon DNAPL's in the NRDWL, the 12-year interval between the initiation of disposal and initiation of groundwater monitoring, and the presence of chlorinated hydrocarbons in the groundwater beneath the SWL which is immediately adjacent to and down dip from the NRDWL.

~~One shallow well will be installed on the north side of the NRDWL, and two, one deep and one shallow, on the south side of the site (Figure 13). The well on the north side is intended to supplement the NRDWL downgradient detection network. The shallow well located on the south side of the landfill will help in separating potential groundwater impacts from the NRDWL and the SWL. The locations of the shallow groundwater monitoring wells are indicated by MEMO modeling results that indicate a minimum monitoring efficiency of at least 93%, essentially independent of groundwater flow direction (DOE 1990). These wells will ensure that the uncertainties between the regional and local groundwater flow directions will be adequately covered.~~ The deep monitoring well, located adjacent to the shallow monitoring well on the south side of the site, will provide for deep aquifer characterization and for detection of DNAPL contaminants on the down dip side of the NRDWL.

3.4.6 Well Drilling and Installation

The groundwater monitoring wells to be constructed at the NRDWL will be a RCRA standard wells constructed to the generic specification for groundwater monitoring wells (WHC 1990). WAC 173-160, *Minimum Standards for Construction and Maintenance of Wells*, was used to set the basic design requirements. This well will penetrate the top of the basalt at a depth of approximately 183 m (600 ft).

Procedures for controlling the well site activities are given in the *Environmental Investigations and Site Characterization Manual*, WHC-CM-7-7 (WHC 1988) and listed in Table 3.

The new wells will most likely be drilled with an air rotary rig. If another method of drilling is chosen, it will have the same advantages as the air rotary method: (1) drill cuttings can be easily contained (important in potentially contaminated material), (2) representative geologic samples can be collected, (3) moisture samples can be collected from above the water table, (4) disturbance to the borehole wall is minimized, (5) a straight, plumb borehole is produced, and (6) groundwater quality is not affected by drilling fluids other than water or air.

Drill cuttings will be routinely monitored for radiation and hazardous material in accordance with a site-specific Hazardous Waste Operating Permit (HWOP). Contaminated cuttings will be handled, transported, and disposed according to the *Environmental Investigations and Site Characterization Manual*, EII 4.2, "Interim Control of Unknown, Suspected, Hazardous and Mixed Waste." If the level of contamination is significant enough to require changes in well design or well location, Ecology will be notified by Westinghouse Hanford prior to making the changes.

Drill rigs and peripheral equipment (such as drill tools, cables, and temporary casing) will be steam cleaned before arriving on site, moving to a new site, and beginning construction of the next well, in accordance with EII 5.4, *Field Cleaning and/or Decontamination of Equipment*. The addition of water to the borehole will be kept to a minimum or avoided. This will minimize well development pumping after wells are completed and minimize the chances of driving any vadose zone contaminants into the groundwater.

Temporary carbon steel casing with a minimum diameter of 20 cm (8 in.) will be driven to total depth as each borehole is advanced. A temporary 20-cm- (8-in.-) diameter telescoping screen may be installed for aquifer testing, if necessary. After the borehole has been drilled to its total depth, the final well casing and screen will be installed and the temporary carbon steel casing will be removed as the filter pack and annular seal materials are placed in the annular space. If a temporary screen is used, it will be left in place.

~~Two of the wells will be drilled approximately 9 m (30 ft) into the saturated sediments. One of the wells will be drilled to the top of the basalt that forms the base of the unconfined aquifer (expected depth is approximately 152 m [500 ft]).~~

Table 3. Applicable Environmental Investigations Instructions.

Number	Title
EII 1.1	Hazardous Waste Site Entry Requirements
EII 1.2	Preparation and Revision of Environmental Investigations Instructions
EII 1.4	Instruction Change Authorizations
EII 1.5	Field Logbooks
EII 1.6	QA Records Processing
EII 1.7	Indoctrination, Training and Qualification
EII 1.9	RI/FS (RFI/CMS) Document Review and Control
EII 1.10	Identifying, Evaluating, and Documenting Suspect Waste Sites
EII 1.11	Technical Data Management
EII 2.1	Preparation of Hazardous Waste Operations Permits
EII 2.2	Occupational Health Monitoring
EII 2.3	Administration of Radiation Surveys to Support Environmental Characterization Work on the Hanford Site
EII 3.2	Calibration and Control of Monitoring Instruments
EII 4.2	Interim Control of Unknown, Suspected Hazardous and Mixed Waste
EII 5.1	Chain of Custody
EII 5.2	Soil and Sediment Sampling
EII 5.4	Field Cleaning and/or Decontamination of Equipment
EII 5.5	1706KE Laboratory Decontamination of RCRA/CERCLA Sampling Equipment
EII 5.7A	Hanford Geotechnical Sample Library Control
EII 5.8	Groundwater Sampling
EII 5.10	Sample Identification and Data Entry into HEIS Database
EII 5.11	Sample Packaging and Shipping
EII 5.12	Air Quality Sampling of Ambient and Downwind air at Waste Sites
EII 5.13	Drum Sampling
EII 5.14	Drum Handling
EII 6.1	Activity Reports of Field Operations
EII 6.6	Ground Water Well Characterization and Evaluation
EII 6.7	Resource Protection Well and Test Borehole Drilling
EII 6.8	Well Completion
EII 9.1	Geologic Logging
EII 10.1	Aquifer Testing
EII 10.2	Measurement of Ground-Water Levels
EII 10.3	Purge Water Management
EII 10.4	Well Development Activities
EII 11.1	Geophysical Logging

Table 4. Groundwater Sampling Parameters[a], Maximum Level.

Interim primary drinking water standards	Maximum level[b]
~~Arsenic~~	~~0.05~~
Barium	1.0
~~Cadmium~~	~~0.01~~
Chromium	0.04
Fluoride	1.4 to 2.4
~~Lead~~	~~0.05~~
~~Mercury~~	~~0.002~~
Nitrate (as NO_3)	45
~~Selenium~~	~~0.01~~
~~Silver~~	~~0.05~~
~~Endrin~~	~~0.0002~~
~~Lindane~~	~~0.004~~
~~Methoxychlor~~	~~0.1~~
~~Toxaphene~~	~~0.005~~
~~2,4-D~~	~~0.1~~
~~2,4,5-TP-Silvex~~	~~0.01~~
~~Radium~~	~~5 pCi/L~~
Gross Alpha	15 pCi/L
Gross Beta	4 mrem/year
Turbidity (surface water only)	1 NTU
Coliform bacteria	1/100 mL
Groundwater quality parameters	
Chloride	
Iron	
Manganese	
Phenols	
Sodium	
Sulfate	
Groundwater contamination indicator parameters	
pH	
Specific conductance	
Total organic carbon	
Total organic halogen	
Site specific parameters	
Tritium	
Volatile halogenated hydrocarbons	

[a]Regulatory requirements for sampling parameters are subject to change because of federal regulations.
[b]Unless otherwise noted, concentrations are in mg/L.

5.0 REFERENCES

29 CFR 1910.120, 1986, "Hazardous Waste Operations and Emergency Response," *Code of Federal Regulations*, as amended.

40 CFR 164.91(a), 1991, "Interim Status Standards for Owners and Operators of New Hazardous Waste Land Disposal Facilities," *Code of Federal Regulations*, as amended.

40 CFR 264, 1980, *Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities*, Title 40, Code of Federal Regulations, Part 264, as amended, U.S. Environmental Protection Agency, Washington, D.C.

40 CFR 265, 1980, *Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities*, Title 40, Code of Federal Regulations, Part 265, as amended, U.S. Environmental Protection Agency, Washington, D.C.

Bierschenk, H. W., 1959, *Aquifer Characteristics and Ground-Water Movement at Hanford*, HW-60601, General Electric Company, Richland, Washington.

DOE, 1986, *Environmental Assessment, Reference Repository Location, Hanford Site, Washington*, DOE/RW-0070, U.S. Department of Energy, Office of Civilian Radioactive Waste Management, Washington, D.C.

DOE, 1988, *Consultation Draft, Site Characterization Plan, Reference Repository Location, Hanford Site, Washington*, DOE/RW-0164, Vols. 1-9, Office of Civilian Radioactive Waste Management, U.S. Department of Energy, Richland, Washington.

DOE, 1990, *Non-Radioactive Dangerous Waste Landfill Closure/Postclosure Plan*, DOE/RL-90-17, U.S. Department of Energy, Richland, Washington.

Domenico, P. A. and G. A. Robbins, 1985, "A New Method of Contaminant Plume Analysis," *Groundwater*, Vol. 23, No. 4, pp. 476-485.

Ecology, 1986, *Consent Agreement and Compliance Order*, DE 86-133, PCHB No. 86-44, Washington State Department of Ecology, Olympia, Washington.

Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, Washington State Department of Ecology, U.S. Environmental Protection Agency, and the U.S. Department of Energy, Olympia, Washington.

EPA, 1986, *RCRA Groundwater Monitoring Technical Enforcement Guidance Document*, OSWER-9950.1, U.S. Environmental Protection Agency, Washington, D.C.

Evans, J. C., D. I. Dennison, R. W. Bryce, P. J. Mitchell, D. R. Sherwood, K. M. Krupka, N. W. Hinman, E. A. Jacobson, and M. D. Freshley, 1988, *Hanford Site Ground-Water Monitoring for July through December 1987*, PNL-6315-2, Pacific Northwest Laboratory, Richland, Washington.

WAC 173-303, 1987, *Dangerous Waste Regulations*, Washington Administrative Code 173-303, Washington State Department of Ecology, Olympia, Washington.

Wallace, R. W., 1977, *Work Isolation Safety Assessment Program: A Comparison of Evapotranspiration Estimates Using ERDA Hanford Climatological Data*, PNL-2698, Pacific Northwest Laboratory, Richland, Washington.

Weekes, D. C., S. P. Luttrell, and M. R. Fuchs, 1987, *Interim Hydrogeologic Characterization Report and Groundwater Monitoring System for the Nonradioactive Dangerous Waste Landfill, Hanford Site, Washington*, WHC-EP-0021, Westinghouse Hanford Company, Richland, Washington.

WHC, 1988, *Environmental Investigations and Site Characterization Manual*, WHC-CM-7-7, Westinghouse Hanford Company, Richland, Washington.

WHC, 1990, *Generic Specifications--Ground Water Monitoring Wells*, WHC-S-014, Rev. 7, Westinghouse Hanford Company, Richland, Washington.

WHC, 1993, *Quality Assurance Project Plan for RCRA Groundwater Monitoring Activities*, WHC-SD-EN-QAPP-001, Rev. 3, Westinghouse Hanford Company, Richland, Washington.

WELL CONSTRUCTION AND COMPLETION SUMMARY

Drilling Backhoe 0↔10-ft
Method: ODEX air rotary
Drilling
Fluid Used: None
Driller's
Name: S. McKinnon/D. Mingo
Drilling
Company: Jensen Drilling Co
Date
Started: 09Sep92

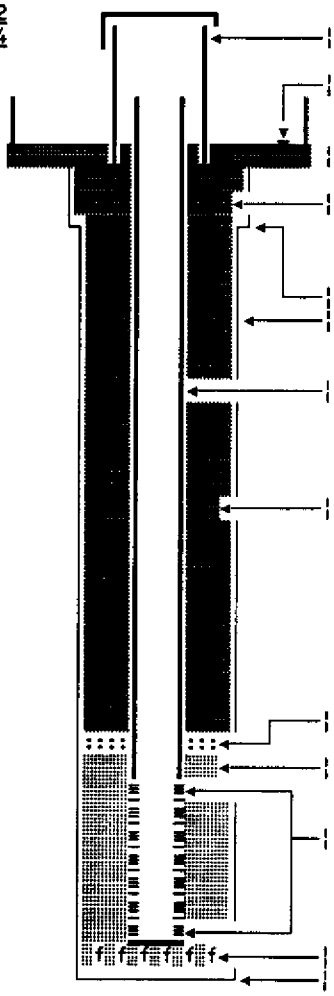
Sample
Method: Air returns
Additives
Used: None
WA State
Lic Nr: Not documented
Company
Location: Not documented
Date
Complete: 22Oct92

WELL NUMBER: 699-25-34D A5419
TEMPORARY WELL NO:
Hanford
Coordinates: N/S N 25,253.6 E/W W 33,847.9
State NAD83 N 131,191.16m E 579,589.97m
Coordinates: N 430,469 E 2,261,412
Start
Card #: Not documented T___ R___ S___
Elevation
Ground surface: 534.47-ft (Brass cap)

Depth to water: 132.4-ft 22Oct92
(Ground surface) 133.3-ft 20Jun94

GENERALIZED Geologist's
STRATIGRAPHY Log
Sl=slightly

0↔84: SAND
84↔101: GRAVEL
101↔103: SAND
103↔126: GRAVEL
126↔126.5: Silty sandy GRAVEL
126.5↔161: Sandy GRAVEL
161↔173: Silty sandy GRAVEL



Elevation of reference point: [537.91-ft]
(top of casing)
Height of reference point above ground surface [3.44-ft]
Depth of surface seal [2.0↔8.6-ft]
Type of surface seal:
Cement grout to 8.6-ft
4-ft x 4-ft concrete pad
extending 2.0-ft into annulus
13-in nominal hole, 0↔9.8-ft
11-in nominal hole, 9.8↔173-ft
4-in ID T304 stainless steel casing, +1.0↔126.8-ft
Bentonite crumbles, 8.6↔119.4-ft
Enviroplug coarse chunk bentonite seal, 119.4↔123.1-ft
Silica sand pack: 123.1↔266.2-ft, 20↔40-mesh
4-in, T304 stainless steel screen, 126.8↔162.0-ft, #10-slot
Fill, 166.1↔173.0-ft
Borehole drilled depth: [173.0-ft]

Drawing By: RKL/6N25W34D.ASB

WELL CONSTRUCTION AND COMPLETION SUMMARY

Drilling Method: Air rotary
Drilling Fluid Used: Not applicable
Driller's Name: S. McKennon/D. Mingo
Drilling Company: Jensen
Date Started: 09Sep92
Date Complete: 22Oct92

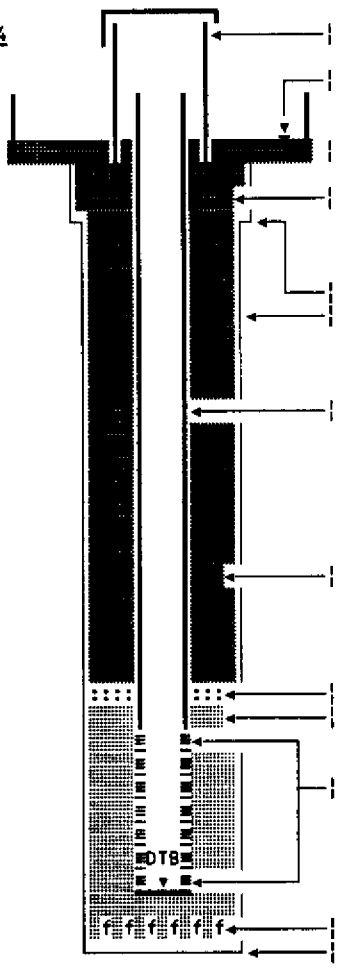
Sample Method: Air returns
Additives Used: None
WA State Lic Nr: Not documented
Company Location: Not documented

WELL NUMBER: 699-26-34B A5420
TEMPORARY WELL NO:
Hanford Coordinates: N/S N 25,782 6 E/W W 33,716.8
State NAD83 N 131,352.50m E 579,629.52m
Coordinates: N 430,998 E 2,261,542
Start Card #: Not documented T R S
Elevation Ground surface: 526.47 Brass cap

Depth to water: 124.1-ft Oct92
(Ground surface) 125.3-ft 20Jun94

GENERALIZED Geologist's STRATIGRAPHY Log

0-74: SAND
74-82: GRAVEL
82-85: Sandy GRAVEL
85-87: GRAVEL
87-99: Gravelly SAND
99-102: GRAVEL
102-108: Sandy GRAVEL
108-119: SAND
119-122: Gravelly SAND
122-124: SAND
124-127: Sandy GRAVEL
127-139: Silty sandy GRAVEL
139-164.9: Pebble cobble GRAVEL



Elevation of reference point: [530.27-ft]
(top of casing)
Height of reference point above ground surface [3.80-ft]

Depth of surface seal [1.5-8.2-ft]
Type of surface seal
Cement grout to 8.2-ft
4 x 4-ft x 4-in concrete pad extends 1.5-ft into annulus

13-in nominal hole, 0-8.5-ft
11-in nominal hole, 8.5-164.9-ft

4-in ID T304 stainless steel casing, +0.7-118.4-ft

Bentonite crumbles, 8.2-111-ft

Enviroplug bentonite chunks, 111.0-115.2-ft
Silica sand pack, 115.2-161.6-ft, 20-40-mesh

4-in T304 stainless steel screen, 118.4-153.6-ft, #10-slot

Fill, 161.6-164.9-ft
Borehole drilled depth: [164.9-ft]

DTB=Depth to bottom, 154.4-ft, 18Dec92

Drawing By: RKL/6N26W34B.ASB

REFERENCES

American Public Health Association (APHA), 1985, *Standard Methods for the Examination of Water and Wastewater*, 16th ed., Washington, D.C.

ASTM, 1986, *1986 Annual Book of ASTM Standards*, American Society for Testing and Materials, Philadelphia, Pennsylvania.

ASTM, 1988, "Standard Test Method for the Radionuclides of Radium in Water," *Annual Book of ASTM Standards*, ASTM D2460, American Society of Testing and Materials, Philadelphia, Pennsylvania.

EPA, 1984, *Test Method for Determination of Inorganic Anions in Water by Ion Chromatography*, EPA-600/4-84-017, Environmental Monitoring and Support Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio.

EPA, 1986, *Test Methods for Evaluating Solid Waste Physical/Chemical Methods*, 3rd ed, EPA SW-846, U.S. Environmental Protection Agency, Washington, D.C.

Krieger, H. L. and E. L. Whittaker, 1980, *Prescribed Procedures for Measurement of Radioactivity in Drinking Water*, EPA-600/4-80-032, Environmental Monitoring and Support Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio.

~~*PNL, 1989, Procedures for Ground Water Investigations, PNL 6894, Pacific Northwest Laboratory, Richland, Washington.*~~

WHC, 1989, *Westinghouse Hanford Environmental Investigations and Site Characterization Manual*, WHC-CM-7-7, Westinghouse Hanford Company, Richland, Washington.

WHC, 1993, *Quality Assurance Project Plan for RCRA Ground Water Monitoring Activities*, WHC-SD-EN-QAPP-001, Rev. 3, Westinghouse Hanford Company, Richland, Washington.

DISTRIBUTION SHEET

To	From	Page 1 of 1
DISTRIBUTION	F. N. Hodges	Date 12/27/1995
Project Title/Work Order		EDT No.
Interim Status Groundwater Monitoring Plan for the Nonradioactive Dangerous Waste Landfill, Hanford, Washington		ECN No. 634620

Name	MSIN	Text With All Attach.	Text Only	Attach. / Appendix Only	EDT/ECN Only
D. J. Carrell	H6-22	X			
D. W. Fritz	H6-22	X			
D. M. Day	H6-06	X			
A. K. McDowell	R1-51	X			
F. N. Hodges	H6-06	(2)			
~~J. S. Schmid~~ D. G. Horton	H6-06	X			
W. R. Thackaberry	H6-32	X			
K. R. Fecht	H4-85	X			
J. Rugg	H4-86	X			
B. A. Williams	H6-06	X			
Central Files	A3-88	(2)			
EPIC	H6-08	(2)			